

**Before the  
Federal Communications Commission  
Washington, DC 20554**

In the Matter of	)	
	)	
Connect America Fund	)	WC Docket No. 10-90
	)	
A National Broadband Plan for Our Future	)	GN Docket No. 09-51
	)	
Establishing Just and Reasonable Rates for Local Exchange Carriers	)	WC Docket No. 07-135
	)	
High-Cost Universal Service Support	)	WC Docket No. 05-337
	)	
Developing an Unified Inter-carrier Compensation Regime	)	CC Docket No. 01-92
	)	
Federal-State Joint Board on Universal Service	)	CC Docket No. 96-45
	)	
Lifeline and Link-Up	)	WC Docket No. 03-109

**REPLY COMMENTS OF  
THE FIBER-TO-THE-HOME COUNCIL**

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## **SUMMARY**

The Fiber-to-the-Home Council's ("FTTH Council" or "Council") comments are focused on the issues of reforming the High-Cost universal service fund and the adoption and implementation of the Connect America Fund ("CAF"). The FTTH Council supports the *NPRM*'s objective in seeking to establish the CAF to bring broadband to unserved areas. Deploying broadband to the approximately seven million housing units without access to adequate broadband service is a worthy objective.

The Council, however, urges the Commission to eschew any proposed reduction or eventual elimination of the High-Cost fund. It is estimated that there are approximately 8-10 million premises in areas where the providers are receiving High-Cost support and where these providers are offering critical broadband service with the capability to upgrade current capabilities. While reforms of the High-Cost fund are warranted to increase efficiency, elimination of, or even a severe reduction in, the fund runs counter to the public interest and the objective to deploy high-performance networks. Rather, the Commission should seek to combine the two approaches, enabling users in unserved areas to finally be able to access broadband and users in high-cost areas to have access to the same higher-performance broadband services offered in urban areas.

In the *NPRM*, the Commission states that one of its goals is to "ensure universal deployment of modern networks capable of supporting necessary broadband applications as well as voice service."<sup>1</sup> However, the Commission then inquires whether a broadband service with performance at 3 Mbps downstream and 768 kbps upstream meets that aim.<sup>2</sup> While that level of performance may be an acceptable near-term objective in the sparsest areas of the country that

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<sup>1</sup> *NPRM*, ¶ 80.

<sup>2</sup> *Id.*, ¶ 108.

have no service whatsoever today, it would deprive rural residents and businesses of broadband performance comparable to that found in urban areas, which is required to comply with the statute and which will enable access to important content and the use of key applications.

In these comments, the FTTH Council presents the case for using High-Cost funding to support the deployment and operation of high-performance (FTTH) broadband networks to rural residents and businesses. It does so by:

1. Examining marketplace demand for content and applications requiring at least 25 Mbps of symmetrical bandwidth and demonstrating there is significant, immediate and growing demand for content and applications requiring high-performance broadband networks.
2. Disaggregating the cost of broadband supply in higher-cost areas to show that, with targeted support, it is economically viable to deploy high-performance networks in many higher-cost areas.
3. Showing that there is a strong case that immediate deployment of high-performance networks is most beneficial and capital efficient.
4. Showing that rural broadband demand and supply can be aligned efficiently with universal service policies.
5. Demonstrating that current High-Cost funding, which leverages government support, will maximize deployments of high-performance networks.

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The Fiber-to-the-Home Council<sup>3</sup> (“FTTH Council” or “Council”) hereby respectfully submits its reply comments to the Federal Communications Commission (“Commission”) in response to the Commission’s Notice of Proposed Rulemaking (“*NPRM*”) in

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<sup>3</sup> The Council’s mission is to educate the public and government officials about fiber-to-the-home (“FTTH”) and to promote and accelerate FTTH deployment and the resulting quality of life enhancements FTTH networks make possible. The FTTH Council’s members represent all areas of the broadband access industry, including telecommunications, computing, networking, system integration, engineering, and content-provider companies, as well as traditional service providers, utilities, and municipalities. As of today, the FTTH Council has more than 200 entities as members. A complete list of FTTH Council members can be found on the organization’s website: <http://www.ftthcouncil.org>.

the above captioned proceeding.<sup>4</sup> The FTTH Council's comments are focused on the issues of reforming the High-Cost universal service fund and the adoption and implementation of the Connect America Fund ("CAF").

**I. INTRODUCTION: THE CASE FOR USING UNIVERSAL FUND SUPPORT TO DEPLOY HIGH-PERFORMANCE BROADBAND TO RURAL AMERICA**

The Council's membership includes a large number of smaller private and public sector providers using FTTH infrastructure (at least in part) to offer voice, high-performance broadband Internet access, and often video services. Many of the private sector service providers are in less dense areas of the country and hence currently draw support from the High-Cost fund. In almost all these instances, this support accounts for a significant portion of these service providers' monthly revenues. Consequently, their lenders consider High-Cost support critical when determining whether to issue loans to them for the construction of facilities. Most recently, with the release of the proposals in the *NPRM* to reform USF, lenders have become more concerned about issuing loans to service providers relying on High-Cost support.<sup>5</sup> This poses an obvious problem for these service providers – and for the Commission's universal broadband goal.

That said, the FTTH Council supports the *NPRM's* objective in seeking to establish the CAF to bring broadband to unserved areas. Deploying broadband to the approximately seven million housing units without access to adequate broadband service is a worthy objective. The Council, however, urges the Commission to eschew any proposed reduction or eventual elimination of the High-Cost fund. While reforms of the High-Cost fund are warranted to increase efficiency, elimination of, or even a severe reduction in, the fund runs counter to the

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<sup>4</sup> *Connect America Fund et al.*, Notice of Proposed Rulemaking and Further Notice of Proposed Rulemaking, FCC 11-13 (released Feb. 9, 2011).

<sup>5</sup> *See e.g.*, Comments of COBANK, ACB, *In the Matter of Connect America Fund et al.*, Notice of Proposed Rulemaking and Further Notice of Proposed Rulemaking, WC Docket No. 10-90, Apr. 18, 2011.

public interest and the objective to deploy high-performance networks. Rather, the Commission should seek to combine the two approaches, enabling users in unserved areas to finally be able to access broadband and users in high-cost areas to have access to the same higher-performance broadband services offered in urban areas.

In the *NPRM*, the Commission states that one of its goals is to “ensure universal deployment of modern networks capable of supporting necessary broadband applications as well as voice service.”<sup>6</sup> However, the Commission then inquires whether a broadband service with performance at 3 Mbps downstream and 768 kbps upstream meets that aim.<sup>7</sup> While that level of performance may be an acceptable near-term objective in the sparsest areas of the country that have no service whatsoever today, it would deprive rural residents and businesses of broadband performance comparable to that found in urban areas, which is required to comply with the statute<sup>8</sup> and which will enable access to important content and the use of key applications.

In these comments, the FTTH Council presents the case for using High-Cost funding to support the deployment and operation of high-performance (FTTH) broadband networks to rural residents and businesses. It does so by:

1. Examining marketplace demand for content and applications requiring at least 25 Mbps of symmetrical bandwidth and demonstrating there is significant, immediate and growing demand for content and applications requiring high-performance broadband networks.

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<sup>6</sup> *NPRM*, ¶ 80.

<sup>7</sup> *Id.*, ¶ 108.

<sup>8</sup> 47 U.S.C. § 254(b)(3).

2. Disaggregating the cost of broadband supply in higher-cost areas to show that, with targeted support, it is economically viable to deploy high-performance networks in many higher-cost areas.
3. Showing that there is a strong case that immediate deployment of high-performance networks is most beneficial and capital efficient.
4. Showing that rural broadband demand and supply can be aligned efficiently with universal service policies.
5. Demonstrating that current High-Cost funding, which leverages government support, will maximize deployments of high-performance networks.

**II. BURGEONING IMMEDIATE AND EXPECTED DEMAND FOR WIRELINE BROADBAND: DRAMATICALLY GREATER SYMMETRIC BANDWIDTH REQUIREMENTS ARE CERTAIN TO GROW DRIVEN BY INTERACTIVE VIDEO COMMUNICATION**

There are many data points attesting to the fact that broadband users are accessing content and applications requiring high-performance broadband networks – those capable of providing services with 25 Mbps symmetrical throughput -- and that this trend is certain to continue to grow. In September 2009, the staff working on the National Broadband Plan (“NBP”) presented to the Commission its current baseline for consumer demand for broadband capacity. Among many other conclusions, the staff noted that enhanced video conferencing for telelearning and HD telemedicine would require 5-10+ Mbps of symmetrical bandwidth and HD<sup>9</sup> streamed video would require 10+ Mbps downstream. The final NBP issued a number of conclusions about user communities requiring very substantial broadband performance requirements, including:

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<sup>9</sup> Presentation of the National Broadband Plan Staff at the FCC Open Meeting (Sept. 29 2009) at 23, available at: [http://www.fcc.gov/openmeetings/2009\\_09\\_29-ocm.html](http://www.fcc.gov/openmeetings/2009_09_29-ocm.html).



Health Care Providers – “Health care providers’ broadband needs are largely driven by the rapidly increasing amount of digital health-related data that is collected and exchanged. A single video consultation session can require a symmetric 2 Mbps connection with a good quality of service...Over the next decade, physicians will need to exchange increasingly large files as new technologies such as 3D imaging become more prevalent. Applications that integrate real-time image manipulation and live video will stimulate demand for more and better broadband because these applications have specific requirements for network speeds, delay and jitter.”<sup>10</sup> The NBP then goes on to conclude that today health care providers need performance capabilities ranging from 4 Mbps (actual) for a sole practitioner to 10 Mbps for a rural center to 100 Mbps for a hospital.<sup>11</sup>

Education Community – “Internet access is nearly universal in the nation’s schools and libraries...However, inadequate connectivity speeds and infrastructure issues are frequently reported, and bandwidth demands are projected to rise dramatically over the next few years. Moreover, there is pent-up demand in schools and communities for access to more broadband content and tools. This demand has not been met in part because applicants require greater bandwidth to use these tools”<sup>12</sup>

In addition to work on the NBP, the Commission, recognizing the demands of health care providers and the education community, has been distributing universal service support to upgrade telemedicine and educational broadband connectivity. For instance, the Commission has provided a grant for the California Telehealth Network’s Rural Health Care Pilot Program, which provides high-speed (45 Mbps) connectivity among 300 rural sites. In discussing this project, the executive director of the California Telemedicine & eHealth Center stated, “Connectivity has been a huge issue around telehealth because you have to have substantial broadband to be able to do video conferencing at the quality you need to do a medical

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<sup>10</sup> National Broadband Plan at 209, 211.

<sup>11</sup> *Id.* at 210.

<sup>12</sup> *Id.* at 254.

examination...If you are trying to diagnose something, you need a picture at a quality where a clinician [is] comfortable making a diagnosis.”<sup>13</sup>

The Commission also recognizes that other communities, like small businesses,<sup>14</sup> have increased needs to access broadband. Earlier this year, the Commission launched a web portal directed to assisting small businesses in accessing and using broadband stating,

Broadband and information technology is increasingly important to the success of our economy, to jobs and to the future of small business. Broadband connectivity and online business tools enables businesses to grow and jobs to be created anywhere. It allows entrepreneurs to market themselves and reach customers in the next neighborhood, the next city, the next state, and even overseas. Cloud-based services can increase efficiency improve a businesses bottom line. A recent study found that having a broadband connection makes a \$200,000 a year difference in median annual revenues for businesses, by reaching new markets and increasing productivity.<sup>15</sup>

The Council applauds the Commission’s focus. Broadband networks are deployed not to individual premises but to communities, and it is the overall demand from these communities that will accelerate higher-performance broadband.

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<sup>13</sup> “High-Speed Telemedicine Network Gaining Steam in California,” Government Technology, May 10, 2011. Available at: <http://www.govtech.com/health/High-Speed-Telemedicine-Network-California.html>.

<sup>14</sup> There are numerous studies finding that small businesses drive economic activity. *See e.g.*, “Small businesses and broadband: Key drivers for economic recovery,” K. Jayakar et. al., Working Paper – March 2010, which states: Small and medium sized enterprises (SMEs), represent more than half of the U.S. gross domestic product (GDP) and generate two-thirds of new jobs. Their role as the primary drivers of growth in employment and innovation is indisputable. Available at: <http://comm.psu.edu/about/centers/institute-for-information-policy/smallbusiness.pdf>. The Council also notes and appreciates the Chairman’s focus on small business broadband access, as most recently demonstrated by his visit to small businesses in Nebraska (“FCC Chairman Julius Genachowski Visits Nebraska May 18<sup>th</sup> to Tour Job-Creating Small Business Made Possible by High-Speed Internet,” available at: [http://transition.fcc.gov/Daily\\_Releases/Daily\\_Business/2011/db0513/DOC-306583A1.pdf](http://transition.fcc.gov/Daily_Releases/Daily_Business/2011/db0513/DOC-306583A1.pdf).)

<sup>15</sup> Available at: <http://www.fcc.gov/cyberforsmallbiz>.

The FTTH Council too has examined the issue of future broadband demand and the applications and content driving growth. In late 2009, the Council asked the business consulting firm, CSMG, to provide the Commission with an analysis of likely future applications and consumer demand for broadband bandwidth.<sup>16</sup> The following are the key findings in the CSMG report, which support the conclusion that consumer demand for symmetrical bandwidth is likely to exceed 25 Mbps by 2015:

- **Consumers are at the Forefront of Next-Generation Access (“NGA”) Applications**

Historically, enterprises adopted broadband before consumers and thus were first users of many of the early applications, such as email and web browsing. However, the typical home broadband connection is now faster than the shared Internet access throughput available to a businesses user. A key factor underlying this trend is that many of the applications described below are fundamentally consumer applications that would not be expected in a business setting. Examples of consumer-driven applications are streaming 3D/HD video on demand, place-shifted 3D/HD video, HD video uploading. Others, such as 3D/HD video conferencing, are natural extensions of applications that are currently gaining significant traction in the business environment. There is evidence that this type of application is already being adopted by consumers. Recent acquisition activity by Cisco,<sup>17</sup> Logitech,<sup>18</sup> and others are signs that major players are gearing up to compete more aggressively in the desktop and consumer video conferencing spaces. Cisco commented, “Within 12-18 months we will have presence in the consumer segment, where every high-definition television could become a TP [telepresence unit].”<sup>19</sup>

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<sup>16</sup> Letter from Thomas Cohen, Counsel, FTTH Council, to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket No. 09-51 (Nov. 2, 2009), available at <http://fjallfoss.fcc.gov/ecfs/document/view?id=7020244293> (“November 2<sup>nd</sup> Ex Parte”). (“CSMG 2009 Study”)

<sup>17</sup> Cisco press release, Cisco Increases Offer Price and Extends Acceptance Period for Recommended Offer to Acquire TANDBERG, available at <http://investor.cisco.com/releasedetail.cfm?ReleaseID=424298>.

<sup>18</sup> Logitech press release, Logitech to Acquire LifeSize Communications, available at <http://ir.logitech.com/releasedetail.cfm?ReleaseID=423468>.

<sup>19</sup> Livemint corporate news, Hewlett-Packard, Cisco eyeing consumer-level telepresence, available at: <http://www.livemint.com/2009/08/25222238/HewlettPackard-Cisco-eyeing.html>. The Cisco consumer-level telepresence device, umi, can be accessed at: <http://home.cisco.com/en-us/telepresence/umi/>. In addition, Sony is expected to launch its 3D TV next year and is projecting it will generate \$11 billion from 3D products by 2013

## • Applications Enabled by NGA Broadband

There are a number of applications, detailed in the figure below, that are enabled by NGA broadband.<sup>20</sup> While forward looking, many of these are already in the latter stages of development, or are even being offered today. Given sufficient consumer connectivity, these are medium term rather than long term prospects.

	Description	Example	Requirements
<b>Advanced HD Video</b>	<ul style="list-style-type: none"> <li>Next-gen super high-resolution video: <ul style="list-style-type: none"> <li>Quad HD: 3840 x 2160 (2160p)<sup>1</sup></li> <li>Ultra HD: 7680 x 4320 (4320p)<sup>1</sup></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Technical approaches are being defined<sup>2</sup></li> <li>Quad HD hardware in development<sup>3</sup>; currently available in Japan</li> <li>Ultra HD undergoing testing in Japan<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>Real-time and streaming: <ul style="list-style-type: none"> <li>Quad HD: <b>64 Mbps</b><sup>1</sup></li> <li>Ultra HD: <b>256 Mbps</b><sup>1</sup></li> </ul> </li> <li>Moderate to high QoS requirements</li> </ul>
<b>3D/HD Video</b>	<ul style="list-style-type: none"> <li>HD stereoscopic video content</li> <li>Requires 3D-enabled content and hardware (TV set, glasses, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Leading CE vendors plan to unveil 3D-capable TV sets beginning in 2010<sup>1</sup></li> <li>Recent 3D movie titles include <i>Toy Story 3</i>, <i>Monsters vs. Aliens</i>, <i>Up</i>, and others</li> </ul>	<ul style="list-style-type: none"> <li>Real-time and streaming 3D video requires <b>32 Mbps</b> per stream<sup>1</sup></li> <li>Moderate to high QoS requirements</li> </ul>
<b>Advanced HD/3D Video</b>	<ul style="list-style-type: none"> <li>Combination of advanced HD (Quad or Ultra) and 3D video formats</li> </ul>	<ul style="list-style-type: none"> <li>Philips and other manufacturers have trialed 3D Quad HD TV sets<sup>4</sup></li> <li>London 2012 Olympics could potentially be shot in 3D and Quad HD<sup>5</sup></li> </ul>	<ul style="list-style-type: none"> <li>Requires 2-4X bandwidth of single Quad/Ultra HD stream<sup>1</sup></li> <li>Potential for <b>256+ Mbps</b> requirement</li> <li>Moderate to high QoS requirements</li> </ul>
<b>Massive Downloads &amp; Uploads</b>	<ul style="list-style-type: none"> <li>Non real-time downloads and uploads of very large files (10+ GB) including images, videos, etc.</li> </ul>	<ul style="list-style-type: none"> <li>GigaPan &amp; Photosynth stitch 100s of photos together (multi-gigapixel images)<sup>1</sup></li> <li>Other types of rich imagery are emerging (satellite, panorama, etc.)<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>12 min HD video can be uploaded in ~10 min with <b>10 Mbps</b></li> <li>Reduced to &lt;10 sec with <b>1 Gbps</b></li> <li>Low QoS required (non real-time)</li> </ul>
<b>Cloud Computing</b>	<ul style="list-style-type: none"> <li>Computing processing power shifted to the network</li> <li>Desktop machine used as thin client</li> </ul>	<ul style="list-style-type: none"> <li>Cloud-based consumer apps emerging (e.g. Google Docs, MS Office 2010)</li> <li>Potential to drive move to thin client computing</li> </ul>	<ul style="list-style-type: none"> <li>Very high QoS required to minimize latency to sustain program performance</li> <li>Current generation bandwidth is sufficient</li> </ul>

**Figure: Applications Enabled by NGA Broadband<sup>21</sup>**

The Yankee Group's presentation to the FCC workshop on fiber architectures cites several applications for which FTTH would be required by 2015.<sup>22</sup> These include multi-way HD video communications, high-end two-way HD video communications, high-end E-Healthcare, and a high-end "Homeworking Suite". Based on the bandwidth requirements of these applications and the public benefits achievable from their deployment, CSMG has defined a standard for NGA broadband of 25 Mbps of actual symmetric throughput at peak times with high-quality of service. This analysis is supported

([www.rttnews.com/Content/BreakINGANews.aspx?ID=1141351&Category=Breaking%20News&SimRec=1&Node=B1](http://www.rttnews.com/Content/BreakINGANews.aspx?ID=1141351&Category=Breaking%20News&SimRec=1&Node=B1)).

<sup>20</sup> The focus in this section is on applications developing soon and in the medium term. It is important to note, as projected in the *Zettabyte Report*, that existing and follow-on 2D video applications are causing bandwidth demands to increase dramatically, placing great stress on existing broadband infrastructure.

<sup>21</sup> This figure sources information from the ITIF, SMPTE, Engadget, Wired and HDTV Org.

<sup>22</sup> Yankee Group, *Future Fiber Architectures and Local Deployment Choices: Architecture Choices and Service Offerings* (Nov. 2009), available at [http://www.broadband.gov/docs/ws\\_future\\_fiber/felten.ppt](http://www.broadband.gov/docs/ws_future_fiber/felten.ppt).

by third-party assessments of future consumer bandwidth requirements, and increasing activity in 3D and HD consumer video. These topics are explored further below.

- **Third Party Bandwidth Requirement Forecasts**

Industry vendors and analysts study future bandwidth requirements to assist with product development and business planning. These forecasts support the assessment that very high bandwidth will be required by consumers within the medium term of 2015:

- ✧ Based on an analysis of historical and current growth in bandwidth usage, Heavy Reading concludes that households will need upwards of 100Mbps downstream (actual delivered throughput) by 2015.<sup>23</sup> The study notes that speed requirements are likely to be elevated in the U.S. compared to Europe, due to greater interest in HDTV and a higher average number of TV sets per household.
- ✧ In addition to high bandwidth requirements, HD video provides challenges for high-quality end-user connections. As Cisco points out, carrier-grade IPTV will need an MTBA (Mean Time Between Artifacts) of greater than 2 hours to give no more than one perceivable error during a 2 hour movie.<sup>24</sup>
- ✧ Bain & Co's analysis of the future bandwidth requirements of a typical household implies that multiple HDTV streams (either through multiple TVs, or multi-channel DVR recording) will require 30+ Mbps of download bandwidth (actual throughput), and that requirements of up to 100Mbps will evolve gradually over time.<sup>25</sup>
- ✧ Motorola estimates that peak data rates for high-use customers in the U.S. already regularly reach around 30Mbps. Within seven years, service providers need to plan for this figure to top 100Mbps of actual throughput.<sup>26</sup> The report concludes that "over the top"

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<sup>23</sup> Heavy Reading, Next Generation Broadband in Europe: The Need for Speed, available at [http://www.heavyreading.com/details.asp?sku\\_id=752&skuitem\\_itemid=734&promo\\_code=&aff\\_code=&next\\_url=%2Fdefault.asp%3F](http://www.heavyreading.com/details.asp?sku_id=752&skuitem_itemid=734&promo_code=&aff_code=&next_url=%2Fdefault.asp%3F).

<sup>24</sup> Cisco, 21<sup>st</sup> Century Broadband, 2008, available at [http://www.broadbanduk.org/component/option,com\\_docman/task,doc\\_download/gid,1018/Itemid,63/](http://www.broadbanduk.org/component/option,com_docman/task,doc_download/gid,1018/Itemid,63/).

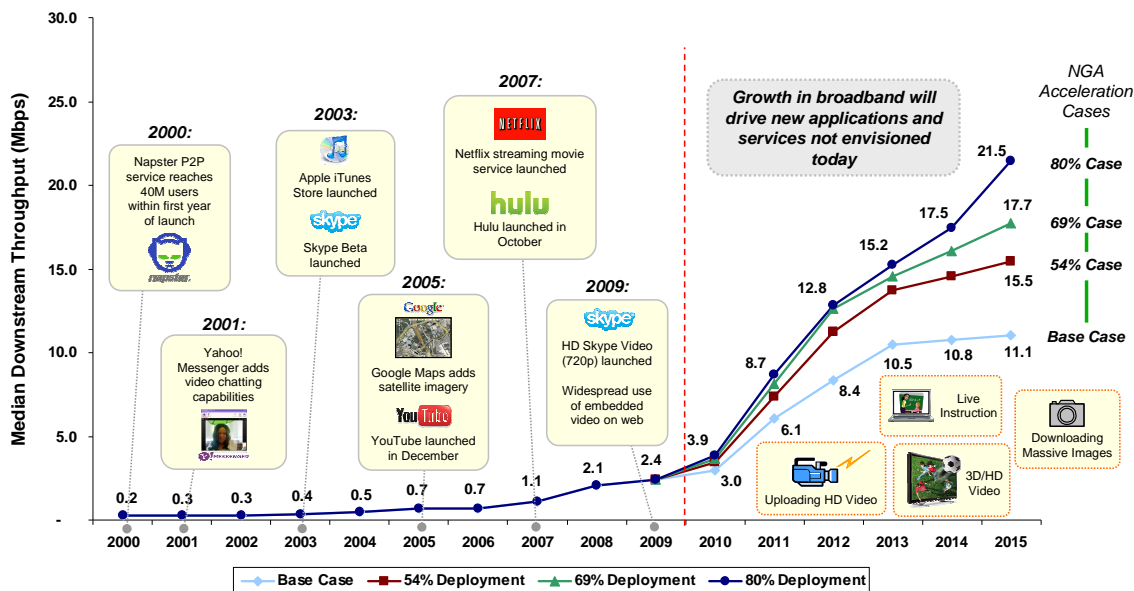
<sup>25</sup> Bain & Co, Next Generation Competition (Oct. 2009), available at <http://www.bain.com/bainweb/publications/pdf.asp?id=27331>.

<sup>26</sup> Motorola, Bandwidth Expansion Guide (2008), available at [http://www.motorola.com/staticfiles/Business/\\_Documents/Event%20Portal/Static%20Files/Bandwidth\\_Expansion\\_Guide.pdf](http://www.motorola.com/staticfiles/Business/_Documents/Event%20Portal/Static%20Files/Bandwidth_Expansion_Guide.pdf).

video content, multi-player online gaming, multi-device households, social networking and videoconferencing will put pressure on both downstream and upstream bandwidths.

- ### Deployment of Applications versus Networks

Historically, the deployment of faster broadband has preceded the introduction of bandwidth-intensive applications. In many cases, such applications are not even anticipated until bandwidth to support them becomes widely available. CSMG believes, as indicated on the following chart and discussion elsewhere in its study, it is highly likely that innovative applications development will lead to as-yet undefined applications with significant public benefit.



**Figure: Median US Downstream Throughput & Representative Internet Applications, 2000-2015**

User-generated video content is one example of a bandwidth-intensive application that was not foreseen until high-speed consumer connections became available. Prior to the launch of YouTube in 2005, there was little sign of consumer interest in online video sharing, yet the site was serving over 100 million videos per day within a year of its launch.<sup>27</sup> This success was clearly due in part to consumer broadband connections having sufficient bandwidth to upload and download videos in a reasonably short time.

<sup>27</sup>

USA Today, July 2006, YouTube serves up 100 million videos a day online, available at: [http://www.usatoday.com/tech/news/2006-07-16-youtube-views\\_x.htm](http://www.usatoday.com/tech/news/2006-07-16-youtube-views_x.htm).

In the wireless market, the high value of specialized mobile applications was not realized until after operators had begun deploying the EDGE and 3G data networks needed to support them. Now that smartphones have access to higher bandwidth connections, these niche applications are becoming a core use of mobile data, and are a central part of wireless advertising (*e.g.*, Apple’s “app for that” iPhone ads)<sup>28</sup> and product development strategy (*e.g.*, Microsoft’s move to include a “Windows Marketplace” on its next smartphone operating system).<sup>29</sup>

The dynamic of performance increases driving unforeseen new applications has also repeatedly played out in the personal computing and Internet space. Recent decades saw a number of famously incorrect underestimates of the PC’s potential. In 1977, then Digital Equipment Corporation CEO Ken Olsen hypothesized in a speech that “No one will ever want a computer in their home.”<sup>30</sup>

The applicability of this dynamic to the U.S. wireline broadband market is supported by a recent joint study by the University of Oxford and the University of Oviedo which concludes that, while U.S. consumers have sufficient broadband quality for today’s applications, the country’s networks are not yet ready for future Internet applications.<sup>31</sup>

In sum, the CSMG 2009 Study extrapolates from known trends and leading edge applications and technology developments to project likely future broadband applications. The FTTH Council recognizes that some of the CSMG predictions about specific applications will turn out to be off-the-mark to some greater or lesser extent, but the Council is confident that the overall trend toward significantly increased broadband demand is correct. From this perspective, based on the history of technology

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<sup>28</sup> Apple, iPhone Gallery - TV ads, available at <http://www.apple.com/iphone/gallery/ads/#gift-medium>.

<sup>29</sup> Microsoft, Microsoft Reveals New Windows® Phones With Marketplace and My Phone Services, available at <http://www.microsoft.com/presspass/press/2009/feb09/02-16MWCPR.msp>.

<sup>30</sup> As cited in ITIF, “The Need for Speed,” March 2009 which says of the quote, “Mr. Olsen’s quote is frequently cited as having been said in a speech he gave to the Convention of the World Future Society in 1977. Fred Shapiro, the editor of “The Yale Book of Quotations,” who seeks the original source of several well-known computer-related sayings and statements, has been unable to find contemporaneous documentation of this. Mr. Shapiro notes the Olsen quote may be apocryphal.”

<sup>31</sup> University of Oxford and University of Oviedo, *Global Broadband Quality Study Shows Progress, Highlights Broadband Quality Gap*, available at <http://www.sbs.ox.ac.uk/newsandevents/Documents/BQS%202009%20final.doc>.



deployment, the Commission should be confident that there will be a wide array of applications for which users in all areas of the country will require access to high-performance broadband networks.<sup>32</sup>

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<sup>29</sup> Another data point indicating the magnitude and type of demand for broadband service is Cisco's 2010 report, *Hyperconnectivity and the Approaching Zettabyte Era*, which documents the burgeoning amount of video streaming and interactive video communications over the Internet – those applications requiring higher and often symmetrical bandwidth -- and contained predictions for continued dramatic growth (available at: [http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/VNI\\_Hyperconnectivity\\_WP.pdf](http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/VNI_Hyperconnectivity_WP.pdf)):

### **Global Video Highlights**

**Internet video is now over one-third of all consumer Internet traffic, and will approach 40 percent of consumer Internet traffic by the end of 2010**, not including the amount of video exchanged through P2P file sharing.

**The sum of all forms of video (TV, video on demand, Internet, and P2P) will continue to exceed 91 percent of global consumer traffic by 2014.** Internet video alone will account for 57 percent of all consumer Internet traffic in 2014.

**Advanced Internet video (3D and HD) will increase 23-fold between 2009 and 2014.** By 2014, 3D and HD Internet video will comprise 46 percent of consumer Internet video traffic.

**Video communications traffic growth is accelerating.** Though still a small fraction of overall Internet traffic, video over instant messaging and video calling are experiencing high growth. Video communications traffic will increase sevenfold from 2009 to 2014.

**Real-time video is growing in importance.** By 2014, Internet TV will be over eight percent of consumer Internet traffic, and ambient video will be an additional five percent of consumer Internet traffic. Live TV has gained substantial ground in the past few years: globally, P2P TV is now over 280 petabytes per month.

**Video-on-demand (VoD) traffic will double every two and a half years through 2014.** Consumer IPTV and CATV traffic will grow at a 33 percent CAGR between 2009 and 2014.



### III. BROADBAND SUPPLY: FTTH NETWORKS, WITH TARGETED AND PROPERLY STRUCTURED SUPPORT, ARE VIABLE IN MANY RURAL AREAS

#### A. INTRODUCTION

During consideration of the NBP, the FTTH Council presented CSMG 2009 Study, demonstrating that it would require approximately \$70 billion of additional capital investment for FTTH networks to pass 80% of the households in the United States. CSMG concluded that the private sector would be responsible for most of the investment but that limited government support, for example in the form of tax credits, would provide important impetus for these deployments.<sup>33</sup> If these network deployments were to occur, because of the enormous broadband performance capabilities of fiber plant,<sup>34</sup> they would, as discussed above, then enable an incredible array of content and applications. These FTTH deployments also would provide robust facilities-based competition, which would lead to lower prices and greater innovation.

For these comments, the Council takes the next step and examines the economics of deployment of FTTH networks to the remaining 20% of households in the nation, where it will cost more to deploy infrastructure. As expected, because of the great

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The conclusions in this Cisco report are supported by a just-released report by Sandvine, Global Internet Phenomena Report. This report found that in North America:

Netflix [video streaming] is now 29.7% of peak downstream traffic and has become the largest source of Internet traffic overall. Currently, Real-Time Entertainment applications consume 49.2% of peak aggregate traffic, up from 29.5% in 2009 – a 60% increase. Sandvine forecasts that the Real-Time Entertainment category will represent 55-60% of peak aggregate traffic by the end of 2011. (Available at: [http://www.sandvine.com/news/pr\\_detail.asp?ID=213](http://www.sandvine.com/news/pr_detail.asp?ID=213)).

<sup>33</sup> CSMG 2009 Study at 36.

<sup>34</sup> See, NBP, Chapter 4. Available at: <http://www.broadband.gov/plan/4-broadband-competition-and-innovation-policy/#s4-1>.

variance in density of premises in these areas, the business case varies substantially among this group. More specifically, as discussed below, it will require many times the level of government support to deploy and operate of wireline infrastructure to the “last 5%” of households.

Once the cost of deployment is known, the Council then turns to examining the most efficient means of deploying broadband infrastructure in rural areas. To begin with, the capital required to deploy FTTH networks has declined by more than 50% in the past decade owing to equipment and cabling innovation, experience in constructing and operating networks, and overall economies of deployment.<sup>35</sup> OFS estimates that an FTTH greenfield deployment has “first costs” of only about \$150 more per subscriber than other access technologies, and FTTH costs of equipment continue to decline. In addition, because of its long-life, the business case for fiber deployments is more properly analyzed based on total life-cycle costs, including reduced annual operating expenditures, rather than first-installed cost. OFS estimates “lifetime” operating expenditure savings for FTTH networks ranges from \$100 - \$250 per subscriber. In other words, overall deployment costs for FTTH are no more than other access technologies while FTTH networks have far greater performance capabilities. Of course, even under such an analysis, a payback period must be reasonable. In these comments, the Council submits that, in those rural areas where the economics are favorable, the Commission encourage the rapid deployment of FTTH because it will enable rural telephone companies to more expeditiously meet customer needs and thereby receive higher

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<sup>35</sup> For all data in this paragraph, see *FTTP Outside Plant*, OFS, 2008. Available at: [www.gcscte.org/presentations/.../FTTH%20-%20Swindell%20-%20OFS.pdf](http://www.gcscte.org/presentations/.../FTTH%20-%20Swindell%20-%20OFS.pdf).

revenues and lower operating costs, which then translates into an eventual reduction in universal service support.

**B. A BRIEF OVERVIEW OF WIRELINE BROADBAND SUPPLY**

Today, as described in the figure below,<sup>36</sup> there are essentially four wireline network access methods over which broadband is delivered: DSL, Fiber-to-the-Node (“FTTN”), Hybrid Fiber-Coax (“HFC”)/DOCSIS 3.0, and FTTH.<sup>37</sup> DSL/FTTN networks pass approximately 85 million households, HFC 110 million, and FTTH 20 million.<sup>38</sup>

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<sup>36</sup> CSMG 2009 Study at 4 (with updates from other industry sources).

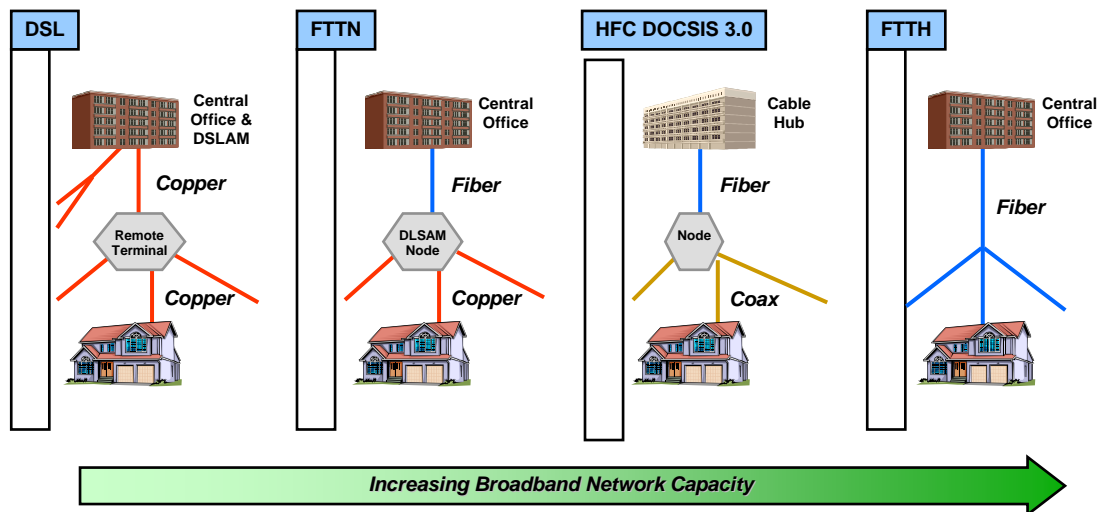
<sup>37</sup> While mobile and fixed access networks may compete, more often they are complementary, especially to meet the needs of users requiring higher-symmetrical bandwidth. *See e.g.*, William Lehr, Mobile Broadband and Implications for Broadband Competition and Adoption *available at*: <http://www.broadbandforamerica.com/sites/default/themes/broadband/images/mail/LehrMobileandBroadbandCompetition.pdf>. “Because it is reasonable to expect that mobile and fixed broadband will continue to be characterized by different service features, I expect that mobile and fixed broadband services will be perceived as distinct and complementary services, rather than as close service substitutes in most user/usage contexts. However, for some subscribers and in some contexts, mobile broadband may be perceived as an acceptable substitute and thereby mobile services will impose a degree of (intermodal) competitive discipline on broadband service markets in general, and on fixed broadband services more specifically. It is likely that mobile broadband will provide most direct competitive pressure on first-generation, lower-quality fixed broadband services.”

<sup>38</sup> CSMG Study, at 5. FTTH households passed were once passed by DSL.

## Broadband Access Methods

Today, a variety of network access methods are used to enable broadband

### *Wired Broadband Network Alternatives*

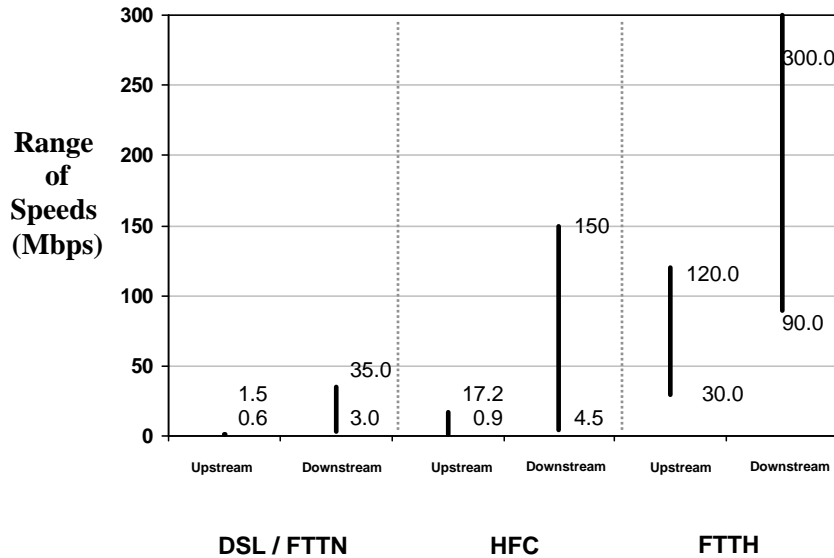


Because of fiber's virtually unlimited throughput capabilities, broadband performance in access networks increases with deployment of fiber closer to the customer, with an all-fiber access network having the ultimate capability. In addition, performance increases by dedicating greater amounts of bandwidth to broadband services, which is an important concern with shared access methods like DOCSIS 3.0 and of less relevance with dedicated access methods like FTTH. The following figure<sup>39</sup> describes the expected broadband performance capabilities of each network access method in the next several years:

<sup>39</sup> This figure is based on the CSMG 2009 Study, at 8.

## Broadband Speeds

### Upstream /Downstream Speeds by Access Method Expected 2015



Performance capabilities are expected to increase far beyond these levels to meet the broadband demand discussed in the previous section. For networks to be competitive later this decade, they will need to provide at least the “100-Squared” capability discussed by the Chairman in the National Broadband Plan.<sup>40</sup> This necessarily means that broadband providers will need to deploy fiber closer to premises. In effect, we are in the midst of a massive construction project, pulling out the copper and coax wire upon which 20<sup>th</sup> Century communications were based and installing all-fiber networks to support the needs of 21<sup>st</sup> Century America.

<sup>40</sup> Available at: <http://www.fcc.gov/blog/americas-2020-broadband-vision>.

**C. THE COST OF FTTH DEPLOYMENTS IN RURAL AREAS VARIES GREATLY, WITH MANY AREAS ECONOMICALLY VIABLE WITH TARGETED SUPPORT**

To examine the cost (investment) for FTTH deployments in the “last 20%” of households, the Council used the following methodology, which is consistent with that used in the CSMG 2009 Study:

1. It estimated the cost to pass using Exhibit 4-C from the Commission’s OBI Technical Paper No. 1,<sup>41</sup> and then correlated these costs with the commensurate least dense wire center areas to determine the formulaic relationship between household density and the “cost to pass.”
2. It applied regression analysis to each wire center area to estimate the “cost to pass.”
3. It calculated the weighted average for each percentile block, e.g. 80 – 85%, and multiplied the sum of households in each percentile block to determine the total investment required.<sup>42</sup>

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<sup>41</sup> FCC OBI Technical Paper No. 1, *The Broadband Availability Gap*, at 62. Available at: <http://download.broadband.gov/plan/the-broadband-availability-gap-obi-technical-paper-no-1-chapter-4-network-economics.pdf>.

<sup>42</sup> The following provides greater detail on the methodology used:

Step 1

- Use cost to serve data from Exhibit 4-C in the FCC’s OBI Technical Paper No. 1 as a basis for the cost analysis. Exhibit 4-C illustrates the estimated cost to serve the 7 million homes considered unserved by the FCC in census block deciles ordered from most dense to least dense areas.
- The underlying assumption is that the 7 million unserved housing units (FCC estimate) represent the homes in the least dense areas of the U.S. and are thus in the last 6% of homes in terms of household density. Put another way, these homes would be from the 94th to 100th percentiles where the 100th percentile is the least dense area of the country. This assumes that the 7 million unserved are ordinarily ranked at the end of the distribution curve. While this is likely to be the case for many of the unserved homes, there are certainly homes that are in denser areas yet still considered unserved. However, the latter point is probably more the exception.
- Using a wire center database, wire center areas were ranked by housing density and the least dense 6% of wire center areas were mapped to the cost to serve estimates for the 7 million unserved (assumed to be the least dense 6%) from Exhibit 4-C. This mapping between housing densities and the FCC’s cost to serve estimates is used to establish a formulaic relationship between these two dimensions, where household density is the independent variable and cost to serve is the dependent variable.

Using this methodology, the Council calculated that the total investment required to pass the last 20% of households in areas that are in the lowest fifth (represented in the chart below as the 80<sup>th</sup> – 100<sup>th</sup> percentiles) in terms of household density (HHs per square mile) with FTTH is approximately \$94 billion.<sup>43</sup> Taken together with the approximately \$70 billion of additional investment required (as estimated by CSMG in 2009) to build FTTH to pass up to the 80<sup>th</sup> percentile (exclusive of existing or projected FTTH deployment plans in place), the anticipated cost to have fiber pass ~100% of U.S. homes is on the order of \$164 billion.

The Council also calculated the total investment required for each of the four percentile groups in the last 20% of households. This breakdown is important to determine more precisely the amount of government support that would be required. The \$94 billion of investment for the last 20% breaks down as follows:

80<sup>th</sup> – 85<sup>th</sup> Percentiles: \$13B

85<sup>th</sup> – 90<sup>th</sup> Percentiles: \$16B

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#### Step 2

- Applying this mathematical equation to the each wire center area yields a modeled cost to serve each area.

#### Step 3

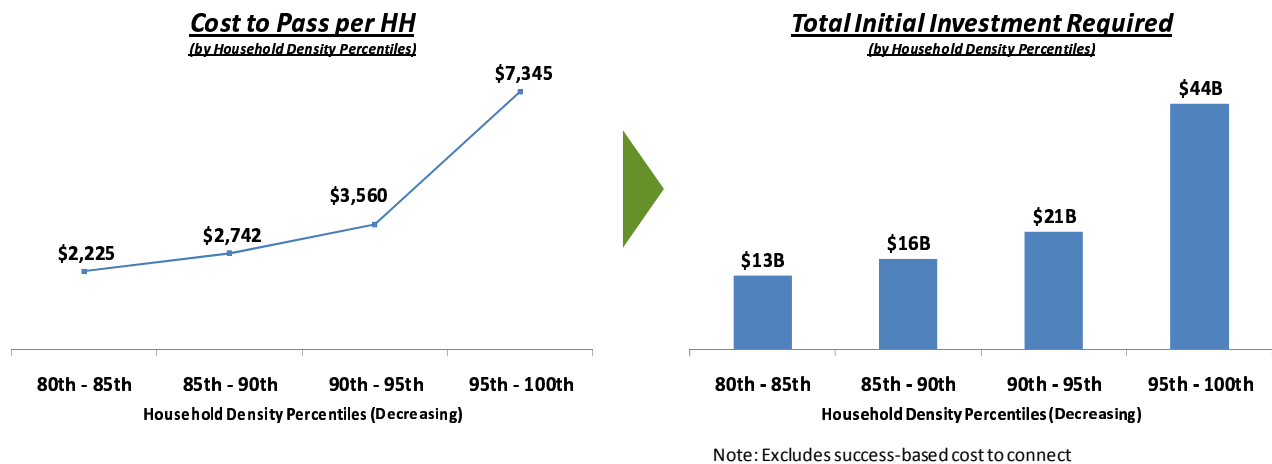
- We then used the household density percentiles to determine which wire center areas fell between the 80<sup>th</sup> and 100<sup>th</sup> percentiles and split these areas into blocks of 5%, i.e. 80<sup>th</sup>-85<sup>th</sup>, 85<sup>th</sup>-90<sup>th</sup>, 90<sup>th</sup>-95<sup>th</sup>, and 95<sup>th</sup>-100<sup>th</sup>.
- Finally, we calculated the weighted average cost to pass for each 5% block and multiplied this average by the number of homes in the 5% block. This represents that total initial investment required for each percentile block.

<sup>43</sup> The \$94B cost to pass, of course, does not include success-based costs, namely the cost to connect, which tends to be relatively constant in the range of \$650-750 irrespective of such factors as household density, geography, and topology, as the drop and equipment costs are generally not materially impacted by the same factors that influence the cost to pass. In the CSMG study for the first 80% of households, the additional, success-based costs would be \$18.2B (based on a 41.5 penetration level).

90<sup>th</sup> – 95<sup>th</sup> Percentiles: \$21B  
 95<sup>th</sup> – 100<sup>th</sup> Percentiles: \$44B

It is notable, and not unexpected, that nearly half of the total cost derives from the disproportionate cost burden from the 95<sup>th</sup>-100<sup>th</sup> percentiles, which exhibit a cost to pass that is more than double that of the next 5% of homes.<sup>44</sup> This in turn means that the level of government support required to bring FTTH to households in the 80-90<sup>th</sup> percentiles, where the average cost to pass is approximately \$2,500 per household, will be much lower and more manageable.<sup>45</sup>

### Capital required to pass the last 20% of households with FTTH



<sup>44</sup> CSMG's study was based on a cost to pass for the most dense areas (up to 54% of households) of \$700 per household. For the next group, 55 – 69%, the cost increased to \$1,246, and for the group 70 – 80%, the cost was \$1,661.

<sup>45</sup> On January 10, 2011, the Nebraska Rural Independent Companies submitted to the Commission in WC Docket No. 10-90 a "Capital Expenditure Study: Predicting the Cost of Fiber to the Premise," prepared by the consulting firm Vantage Point. The methodology in that study differed from that used herein by the FTTH Council in that it included the costs to serve 100% of an area's subscribers and engineering costs. The Council does not believe, because of competition and demand, that the 100% service number is appropriate and instead uses 42% penetration. As for engineering costs, these are not generally included in capital budgets.



**D. EFFICIENTLY DEPLOYING WIRELINE NETWORKS IN RURAL AREAS: THE CASE FOR IMMEDIATE UPGRADES TO FTTH**

Rural telephone companies understand that broadband demand is surging and copper plant does not have sufficient capability to meet this demand. If rural households are to have access to broadband service with sufficient capability and optimally on a competitive basis, rural telephone companies (at least in the 80 – 90<sup>th</sup> percentile) will need to develop a viable business case to upgrade their networks to FTTH. In addition, there is a strong argument that the Commission should encourage this process to occur rapidly because it will enable rural telephone companies to more expeditiously meet customer needs and thereby receive higher revenues and lower operating costs, which then translates into a reduced need to receive universal service support. In other words, by ensuring continuation of High-Cost support for a sufficient period, the Commission has the opportunity to reduce eventual support and use these funds, if necessary, for the delivery of broadband in unserved areas.

Not only do immediate deployments make sense from a customer satisfaction and revenue perspective, it is likely more capital-efficient. A phased approach to upgrading DSL plant to FTTH over many years has numerous drawbacks. First, because of surging broadband demand, the upgrade process will effectively be never-ending, diverting the focus of the business and requiring additional resources to plan and implement each upgrade. Second, FTTH networks provide far greater performance in comparison to the capital required, i.e., an upgrade to FTTN costs 40% of a FTTH build but provides only 5% of the performance capability.<sup>46</sup> Third, as discussed above, deploying FTTH networks lead to immediate and substantial operating cost savings. At Verizon, for instance, after FiOS was deployed the “network report

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<sup>46</sup> This information is taken from a presentation in 2011 by Calix, *Optimize Cost Structure with Fiber in Competitive Markets*, at 19.

rate,” which drives service visits by technicians, dropped by 80%. In addition to these benefits, GPON plant can be readily upgraded to the next-generation of PON architecture, which has far greater performance capabilities, at minimal cost. In sum, the Commission should understand that the case for deploying FTTH immediately rests on a combination of factors, ranging from the consumer and competitive benefits of having greater performance capabilities to long-term cost efficiencies and ease of moving to next-generation networks.

#### **IV. DEVELOPING EFFICIENT AND EFFECTIVE UNIVERSAL SUPPORT MECHANISMS TO PROPEL HIGH-PERFORMANCE BROADBAND IN RURAL AMERICA**

##### **A. INTRODUCTION**

Under the current High-Cost support mechanism, rural telephone companies receive regular operating support payments to ensure the provision of voice service by these carriers is comparable in price and quality to that received in other areas of the country. In the *NPRM*, the Commission is considering expanding the services covered by support to ensure broadband service is delivered to households in unserved areas. The Commission’s broadband proposal departs significantly from the current support mechanism in two ways. First, support would not be targeted to high-cost areas but rather to areas unserved by broadband. Second, support would be awarded through a reverse auction with the winning bidder receiving a fixed grant amount to build infrastructure. In this section, the Council evaluates whether support delivered through a fixed grant is more likely to maximize the deployment of broadband networks than the current operating support mechanism.

**B. BECAUSE IT LEVERAGES GOVERNMENT SUPPORT AND LOWERS INVESTMENT RISK, THE CURRENT HIGH-COST SUPPORT MECHANISM IS MORE LIKELY TO LEAD TO GREATER DEPLOYMENT OF HIGH-PERFORMANCE BROADBAND INFRASTRUCTURE**

**1. OVERVIEW OF ARGUMENT**

In the *NPRM*, the FCC proposes granting winning bidders of a reverse auction to deploy broadband in unserved areas a fixed grant amount to be disbursed in a few discrete increments. The example given in the *NPRM*<sup>47</sup> holds that the winning bidder would get 50% of the grant upon submission of a successful application, with the remainder paid out upon reaching an unspecified milestone. This support mechanism departs from the current paradigm, under which high-cost support recipients receive a recurring stream of monthly payments on a per line basis. As discussed below, reforming the High-Cost program in this manner could lead to reduced broadband infrastructure investment.

**2. ANALYSIS OF HIGH-COST SUPPORT VERSUS CONNECT AMERICA FUND GRANT SUPPORT**

High-Cost support disbursement generates a quasi-guaranteed stream of payments backed by a government program. Support from the High-Cost program face the risk of regulatory change (as discussed in the *NPRM*) and the risk of diminution due to fewer lines, so there is some risk that a recipient will not receive this support going forward. Furthermore, current recipients carry operational and default risk, but the receipt of High-Cost support significantly mitigates these risks by creating a stable and sustainable cost recovery mechanism.

In capital markets, a near-guaranteed stream of recurring payments backed by the government with low risk of default is equivalent to coupon payments of U.S. Treasury bonds. Because of the low default risk of these bonds, investors view them as “risk free.” While neither

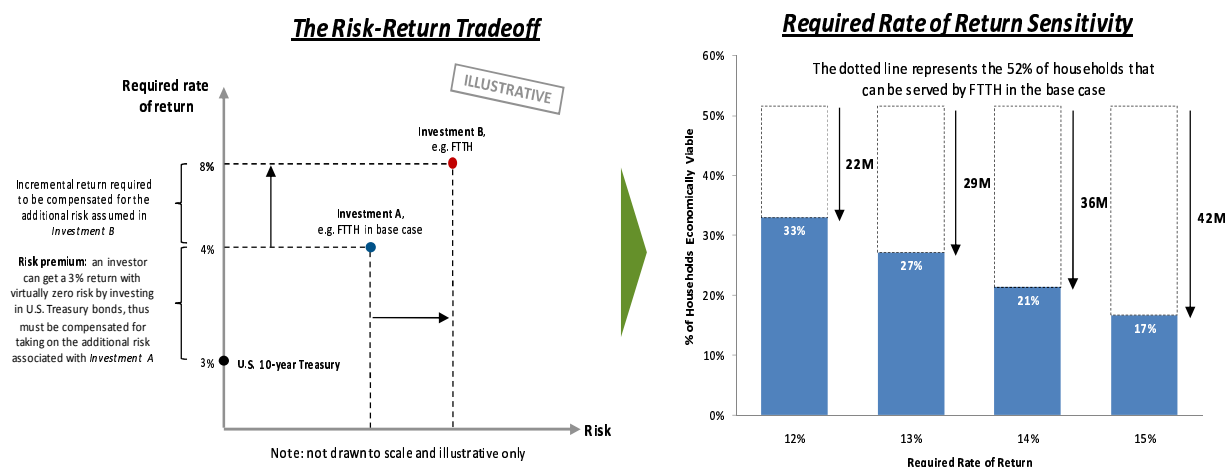
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<sup>47</sup> *NPRM*, ¶ 361.

High-Cost support nor their recipients are literally risk free, investors view them as such and typically demand a relatively modest risk premium above the risk free rate of the Treasury Bond of comparable term length.

The proposed shift toward an upfront fixed payment subsidy adds considerable risk by removing the recurring, stable, and sustainable subsidy stream that has assuaged investors historically. To accommodate this risk, investors will demand a higher premium or higher interest rates on debt or loans. Other investors will back away from lending to the riskier venture. As such, the proposed subsidy model change could lead to lower FTTH investment (see the *Figure 2* below) for two reasons. First, higher borrowing rates raise the entity's cost of capital, which elevates hurdle rates that need to be met for a given investment. Second, borrowing will become more difficult and/or more expensive. These two effects are discussed in greater detail below.

**Figure: Illustrative impact of higher risk premiums on FTTH investment<sup>48</sup>**



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The base case statistic about 52% of households being served by FTTH was derived by CSMG in the CSMG Study.

a. **THE PROPOSED CHANGES WILL RAISE A WINNING  
BIDDER'S HURDLE RATE ON INVESTMENTS**

Shifting from an effective annuity subsidy model to a fixed payment subsidy model creates uncertainty around the cost recovery mechanism, making the venture riskier and causing creditors to demand a higher risk premium. This translates to higher borrowing costs, which raises the cost of capital in a winning bidder's capital structure. A company's cost of capital determines its "hurdle rate" for investment decisions. The hurdle rate is the minimum rate of return required on a project in order to proceed with the project. If the cost to borrow (and thus finance a project) is higher, then the project needs to generate a higher return in order to receive approval.

Through this project financing and investment decision process, the new model of subsidy disbursement will reduce investment in FTTH infrastructure in rural areas. Higher overall borrowing costs vis-à-vis the current system will cause a general elevation of hurdle rates that will cause some FTTH investments to not "get over the hurdle." In other cases, projects may need to be scaled back in order to meet the hurdle rate. Either way, there is reduced investment in FTTH.

To illustrate the potential effect on cost of capital and hurdle rates, one can compare lower risk payment streams with higher risk payment streams. Low risk payment vehicles such as municipal bonds,<sup>49</sup> lottery payouts,<sup>50</sup> and structured settlements / annuities<sup>51</sup> serve as

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<sup>49</sup> Yields based on 10-year municipal bonds as reported on <http://www.bloomberg.com/markets/rates-bonds/government-bonds/us/>

<sup>50</sup> Implied discount rate calculated by comparing lump sum payment with 26 year payout amounts shown on [www.usamega.com/powerball-jackpot.asp](http://www.usamega.com/powerball-jackpot.asp).

<sup>51</sup> Annuity rate based on 10-year Midland National Life annuity as reported on <http://www.annuityadvantage.com/index.html>

reasonable proxies for the current subsidy model. In each case, the payments are backed by a credible and low default risk entity or capital source, i.e., state/federal government or a lump sum cash reserve. This credible backing is the parallel between these payment vehicles and the current High Cost support model.

In contrast, a fixed grant support model will provide some initial funding but will not provide ongoing support and additional capital expenditure funding. An analogy of this model is a startup venture receiving seed capital to get going, but then having to rely on capital markets to persist and grow. Since this mode is inherently riskier, financing rates may be more in line with high yield debt rates, which are currently at 7%.<sup>52</sup> Another comparison for this model is the business model of a cable overbuilder, such as RCN, Knology, or WOW!. Overbuilders believe that with an initial investment, they can go out and win subscribers in the open market. Similarly, the winning bidder in a reverse auction will receive a fixed payment to help finance a network build and then attempt to build a business without ongoing subsidy support. Based on one cable overbuilder's capital structure, the weighted average cost of capital (WACC) for such a business model is 9%.<sup>53</sup>

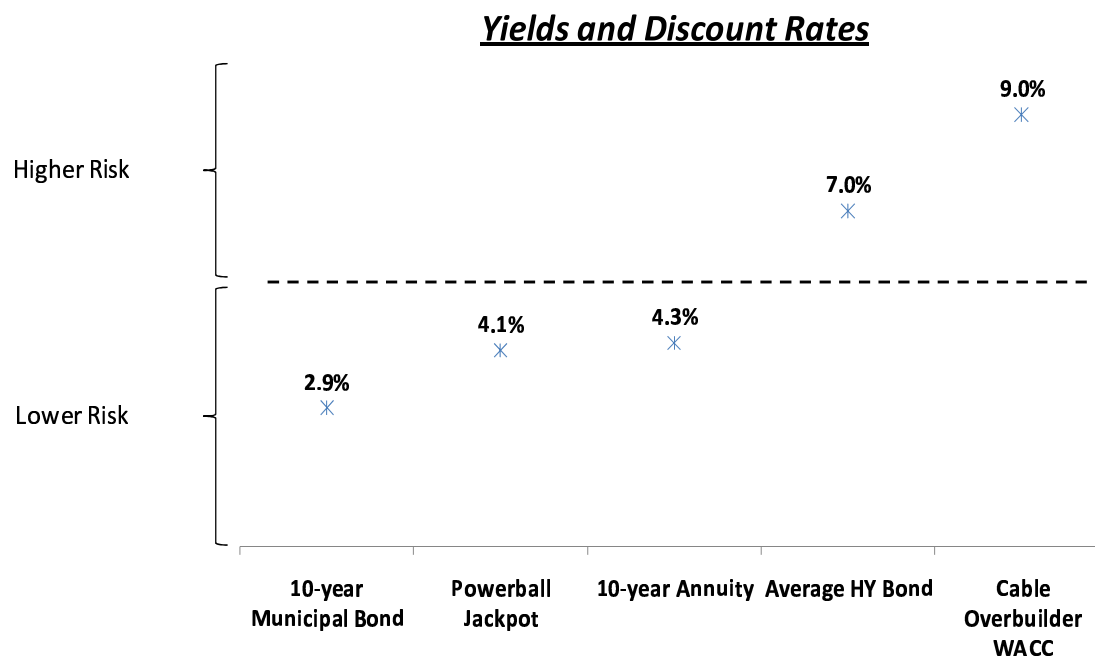
As shown in the *Figure* below, the proposed subsidy model change could cause hurdle rates to nearly double, from ~4% to ~8% based on these analogs.

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<sup>52</sup> See, <http://www.businessinsider.com/junk-bond-bubble-2011-2>.

<sup>53</sup> WACC calculated for Knology based on financial statements in 2010 10-k.

**Figure: Yields and discount rates for select payment vehicles and a cable overbuilder**



b. **THE PROVISION OF FIXED GRANT SUPPORT (IN CONTRAST TO CURRENT HIGH-COST SUPPORT) WILL IMPAIR A WINNING BIDDER’S ABILITY TO BORROW**

Lenders like to see stable revenue streams that support a carrier’s ability to repay its debt. Removing the recurring High-Cost support streams will cause reduced willingness to lend or higher risk premiums, both of which lower infrastructure investment.

**Supporting Evidence: CoBank Case Study**

Fortunately, the response of capital markets to the proposed subsidy disbursement mechanism does not need to occur on an *ex post* basis only, but can be anticipated through *ex ante* commentary. For example, CoBank has submitted a response to the *NPRM* suggesting that the proposals could “hinder private financing.” CoBank is a cooperative bank whose mission is

to foster the development of rural America through lending to agricultural, communications, and utility businesses, so it is in the position to evaluate the ramifications of the proposed changes.

In 2010, CoBank had a loan portfolio of \$50 billion, with \$3.5 billion in loan commitments to over 200 rural communication companies in the U.S.<sup>54</sup> Based on CoBank financial statements, the mean implied interest rate on its loans is approximately 2%. While there is no mention of the average term length of the loan portfolio, we can assume that because these loans are used to finance long-term capital projects, the term length is generally in the three year range. Currently, the three-year Treasury yield is 1%. With a 1% spread above the three-year Treasury, CoBank’s loans are relatively cheap forms of financing.

	<b>2010</b>	<b>2009</b>	<b>2008</b>
Total Loans	\$ 49,992	\$ 44,174	\$ 44,550
Net Interest Income	\$ 951	\$ 946	\$ 863
Implied Interest Rate	1.9%	2.1%	1.9%

However, “cheap” is a misleading adjective in capital markets. A fairer characterization is that the risk premium of 1% is sufficient to compensate CoBank for the risk it undertakes in making these loans. CoBank is able and willing to lend with this low risk premium because the perceived risk of default is low due to a government program-backed recurring revenue stream. In its response to the *NPRM*, CoBank has suggested that changing the system such that these recurring subsidy streams go away could cause CoBank and other lenders to change their lending practices. Specifically, CoBank says that it “has concerns about the ability to finance and maintain the rural backbone without a stable, consistent source of cost recovery.” CoBank substantiates its assertion by “putting its money where its mouth is,” saying, “CoBank would immediately be able to increase our rural incumbent local exchange carrier’s access to capital by

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<sup>54</sup> *Comments of CoBank, ACB* submitted on April 18, 2011.



30-40% if the CAF is structured in a similar fashion to the USF model to support broadband.”

Thus, if CAF distributions to these rural companies is \$2 billion annually, this would represent approximately an additional \$700 million that could be used annually to deploy broadband, which for FTTH would mean an additional 280,000 homes passed annually.

The following real world and recent example illustrates how the current subsidy support mechanism and CoBank, or other external, financing combine for FTTH investment:

Several years ago, Wamego Telecommunications (WTC), a rural telco in Kansas that serves approximately 5,500 telephone customers, 3,000 internet customers, and 2,500 TV customers<sup>55</sup>, began building one of the first FTTH networks in rural America and as of 2010 was able to serve about half of its service territory. In order to build out the rest of its network, WTC turned to CoBank for financing and rapidly secured a new term loan. In each of the last five years, WTC has received between \$500k and \$600k from the High Cost program.<sup>56</sup> This stable and predictable source of revenue was no doubt a factor in CoBank’s willingness to lend to WTC.

One can see a similar scenario unfolding under the proposed regulatory regime, with one critical difference. A winning bidder could use the CAF funding to begin building its FTTH network, and similar to WTC, could achieve 50% service area deployment. At that point, external financing would be required, but without the recurring subsidy payment stream, lenders would demand a higher risk premium. A higher risk premium translates to a higher cost of capital, which could either reverse the decision to continue the network build or reduce the projected coverage area.

**V. TO MAXIMIZE UNIVERSAL BROADBAND DEPLOYMENT COMBINE THE CONNECT AMERICA FUND PROPOSAL WITH THE CURRENT HIGH-COST MECHANISM**

In these comments, the Council has demonstrated that: (1) rural households require access to broadband service at performance levels far in excess of the proposed 4/1 Mbps; (2)

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<sup>55</sup> [http://www.vmware.com/files/pdf/customers/06Q2\\_cs\\_vmw\\_WTC\\_VDI\\_english.pdf](http://www.vmware.com/files/pdf/customers/06Q2_cs_vmw_WTC_VDI_english.pdf)

<sup>56</sup> [http://www.fcc.gov/Daily\\_Releases/Daily\\_Business/2011/db0425/DOC-303886A1.pdf](http://www.fcc.gov/Daily_Releases/Daily_Business/2011/db0425/DOC-303886A1.pdf)

with targeted support, a viable and efficient business case can be made for FTTH deployments in many rural areas; and, (3) the current support mechanism best leverages government resources to bring about universal broadband deployment. Based on these conclusions, the Council believes that the objective of the CAF to bring broadband to unserved areas is important but insufficient to achieve the Commission's universal broadband goals, and the Commission should couple this objective with continuing support for broadband in High-Cost areas.

Smaller, more rural local exchange carriers ("LECs") are estimated to spend \$2 billion annually, in large measure due to receipt of High-Cost support, to upgrade their infrastructure for the delivery of broadband services.<sup>57</sup> As a result, the rural LECs in the Traffic Sensitive Pool (serving approximately 4.76 million access lines) now offer broadband services to 92% of the premises in their areas, of which approximately 200,000 of these premises are served by more advanced all (or partial) fiber networks.<sup>58</sup> Unfortunately, this means that some 4 million premises with broadband service have the potential to be stranded by the elimination of, or material reduction in, the High-Cost fund. In addition, the Council estimates that other LECs accessing High-Cost support and providing broadband services serve approximately an additional 4-6 million premises.<sup>59</sup> That means, a total of 8-10 million premises with broadband service may be stranded with the end of or substantial reduction in the High-Cost fund.

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<sup>57</sup> See, e.g. Comments of the National Exchange Carrier Association, Inc. on NBP Public Notice #19, *In the Matter of The Role of the Universal Service Fund and Intercarrier Compensation in the National Broadband Plan*, GN Dockets Nos. 09-47, 09-51, 09-137 (Dec. 7, 2009) at 5. ("NECA Filing")

<sup>58</sup> NECA Filing at Appendix A (NECA, *Trends 2009*, p. 18).

<sup>59</sup> See, *Federal Universal Service Support Mechanisms Fund Size Projections for Third Quarter 2010*, Universal Service Administrative Company, (Apr. 30, 2010), Appendix HC05; Comments of Windstream, Inc., *In the Matter of A National Broadband Plan For Our Future*, GN No. 09-51, June 8, 2010 at 2 (discussing broadband availability and performance).

Yet, the *NPRM* seems to discount the value of this broadband deployment, proposing to severely reduce and then potentially eliminate High-Cost support. Already, as noted earlier in these comments, because of the proposed cuts in High-Cost support in the *NPRM*, the FTTH Council's service provider members are seeing access to capital being restricted, which negatively effects their plans to enhance and extend broadband service. Other service providers in high-cost areas are curtailing their deployments of new infrastructure fearing an inability to recoup their investments because the *NPRM*'s proposals have much different objective and mechanism for establishing what areas get support and what providers will be able to access support.

The FTTH Council agrees that the current High-Cost fund has not provided sufficient incentive for some carriers, particularly the larger price-cap carriers, to deploy broadband in unserved areas. That is why a CAF is needed. But, the High-Cost fund has real value in enabling the construction of broadband-capable networks – networks that otherwise would not have been built. Moreover, these broadband-capable networks have performance characteristics that far exceed those proposed in the *NPRM* as a basis for funding providers that would be supported by the CAF. Thus, instead of seeking to shift the USF to a completely new paradigm, the Commission can best achieve its universal broadband objective by seeking to preserve and build upon the successes of the High-Cost fund and meld the aim of this fund with the CAF's new objective to reach unserved areas.

Finally, rural telephone companies currently drawing support from the fund have expended capital and lenders have made commitments based on an expectation that High-Cost support would not decline, at least dramatically. Further, this expectation was not unreasonable. As little as some two years ago, in the Commission's most recent attempt at reforming universal

service, support was largely maintained at current levels so long as broadband performance mandates were met. In addition, should funding be reduced precipitously, harm would fall most on households in these rural areas. As the Commission moves forward, it should understand that maintaining the integrity of its processes and action is important.

## **VI. CONCLUSION**

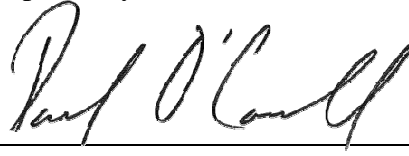
The FTTH Council understands the high costs involved in deploying broadband plant in the least dense areas of the country. During development of the *NBP*, it submitted detailed economic evidence of the costs to deploy fiber infrastructure in these areas.<sup>60</sup> Thus, while the Council believes the performance targets of 4 Mbps downstream and 1 Mbps upstream for the CAF are insufficient to meet user needs, it understands these targets have been adopted to control the costs of support. But, as just noted, it is estimated that there are approximately 8-10 million premises in areas where the providers are receiving High-Cost support and where these providers are offering critical broadband service with the capability to upgrade current capabilities.<sup>61</sup> These comments demonstrate that these individuals in these premises require high-performance broadband and these needs can be addressed efficiently with FTTH networks through High-Cost support and capital funding in the form of loans from the RUS or private sector lenders. Thus, by enabling these wireline service providers to continue accessing the High-Cost fund, the Commission will ensure that many more users will have access to high-performance broadband services.

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<sup>60</sup> See, FTTH Council Ex Parte, *In the Matter of a National Broadband Plan for Our Future*, GN Docket No. 09-51 (Oct. 14, 2009); Corning Ex Parte, FTTH Deployment Assessment at 8, *In the Matter of a National Broadband Plan for Our Future*, GN Docket No. 09-51 (Oct. 15, 2009).

<sup>61</sup> The potential number of premises omitted from consideration in the *NBP* may actually be greater. The *NBP* gives special attention to the seven million housing units covered under the CAF. In addition, the plan expects that 100 million housing units will be covered in the 100 Mbps goal. That leaves 23 million housing units in the United States, most of which are in high-cost areas, to be addressed.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Dan O'Connell", written over a horizontal line.

Daniel O'Connell

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